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Fungal rhinosinusitis in a patient with the multiple myeloma – case report

Anna Roszkowska[1], Tomasz Bąk[2], Jolanta Wojciechowicz[2], Anna Gawęda[2], Tomasz Tomaszewski[2]

[1] Student's Research Circle, Chair and Clinic of Maxillofacial Surgery, Medical University of Lublin
[2] Chair and Clinic of Maxillofacial Surgery, Medical University of Lublin

Abstract:

It estimated that even one fifth of the general population may be affected by sinusitis. The significant increase of fungal rhinosinusitis over the last few years indicates the need of considering this diagnosis as possible in every patient affected by chronic rhinosinusitis.

A case report of 58-year-old female treated displaying hematologic malignancy accompanied by chronic invasive sinusitis of maxilla is discussed herein.

Keywords: fungal rhinosinusitis, chronic fungal sinusitis, Aspergillus spp., multiple myeloma

Introduction:

Immunological impairment is a common problem within the hemato-oncological patients group[1]. Due to profoundly high risk of the bacterial, viral and fungal infection in immunocom-promised patients, either mild or indolent symptoms of the developing infection should be under caution, as the treatment success is determined on its prompt implementation[2]. Acute fungal sinusitis is usually characterised by facial pain, fever, nasal congestion and even specific cranial nerve disorders, whereas chronic fungal sinusitis may display little to any symptoms. Either acute or chronic fungal sinusitis is regarded as a common result of immunosuppression in hematologic patients[3].

Case report:

A 58-year-old female primarily diagnosed with multiple myeloma IgG lambda (II stage according to Durie-Salomon staging system; II stage according to ISS VGPR; del 17 p;t (4:14) and qualified to undergo autologous hemopoietic stem cell transplantation (aHSCT) was admitted to the Department of Maxillofacial Surgery Clinic in Lublin due to complaint about continuous nasaldischarge accompanied by pain of the right side of the face resembling rhinosinusitis.According to the medical history of the patient, she was diagnosed with MM in May 2017 and due to underlying disease she suffered from the compression fracture of the spine. Other reported conditions and medical procedures embrace: peptic ulcers of stomach and duodenum, cholecys-tectomy. At the time of being admitted to the Maxillofacial Surgery Clinic the patient was undergoing chemotherapy and had already received sixth course of bortezomib -thalidomide-dexamethasone combination (VTD). She also underwent radiotherapy of the spine. Her initial serum protein typed as IgG lambda decreased from

3,64g/dl to 0,10 g/dl after forth course of VTD. Patient was qualified to aHSCT.Basing on physical examination and ailments reported by the patient, the decision to perform computed tomography (CT) of the head was made. The CT scan disclosed abnormal massive bulging ridges of the right maxil-lary sinus with excessive masses in its lumen. Medical history of the patient along with computed tomography result suggested fungal maxillary sinusitis as a possible cause.

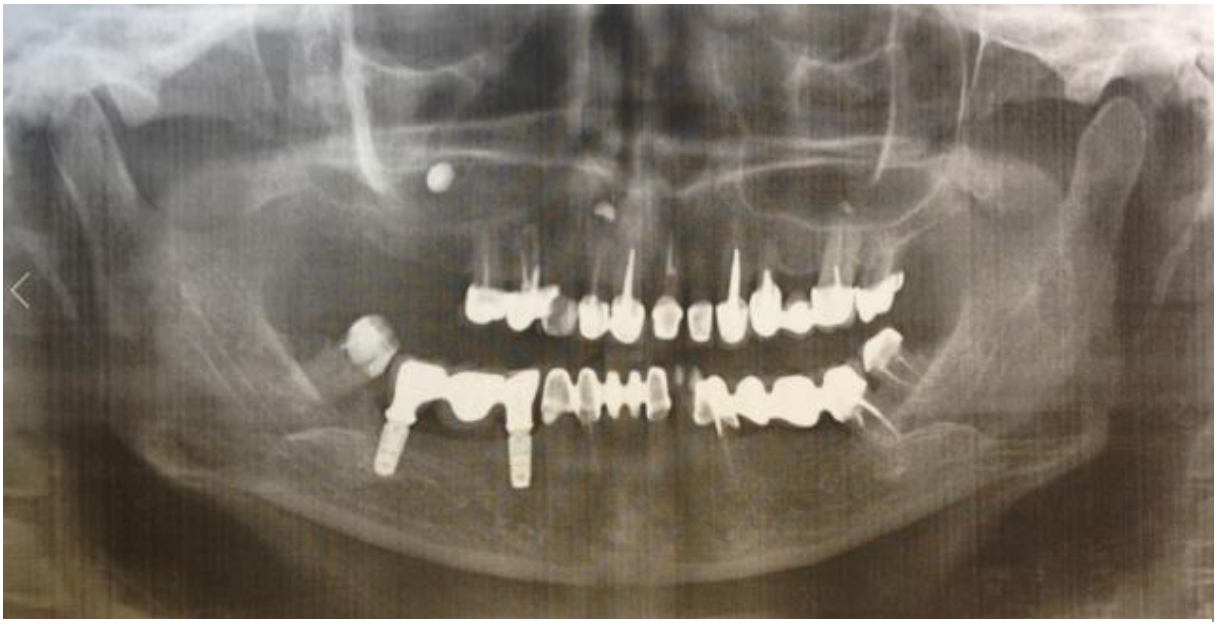
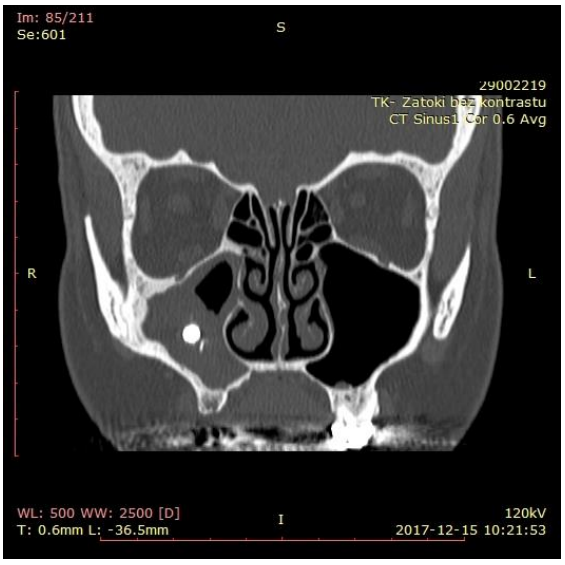


Figure 1.: X-ray made before surgical treatment.



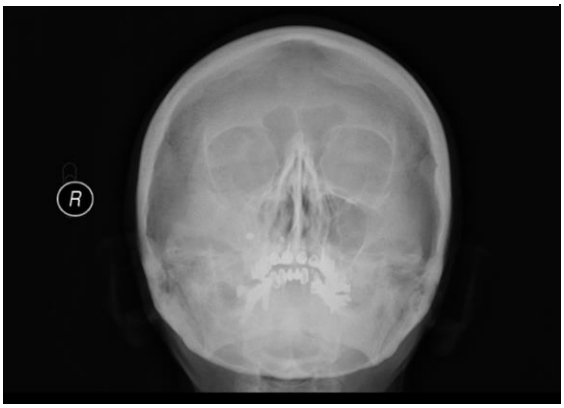
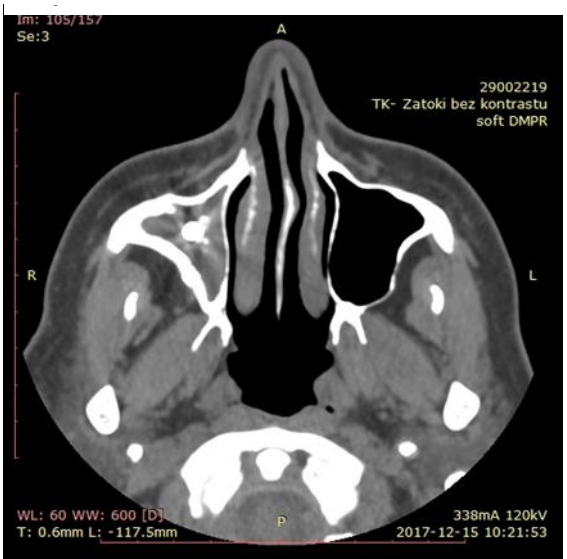


Figure 4.: X-ray of the head – before surgical treatment.



Surgical procedure was performed under general anaesthesia with endotracheal

intubation of the patient. The access to the right maxillary sinus was reached by cutting vestibule mucosa on the right side of oral cavity. A mucoperiosteal layer was dissected. The front wall of the maxillary sinus was revealed trough Cadwell-Luc approach. Visible fungal masses disclosed within the maxillary sinus during surgery were removed. Additionally, the walls of maxillary sinus were filled with hyper-trophied mucosa, which was subsequently removed. The improvement of the maxillary sinus drainage was performed by dilation of its outlet. The alveolar bone was abolished above the 11 and 12 tooth. The dental material was removed from the 11 and 12 tooth and root resection was performed. Finally, the wound was sutured. A seton was established in the right nasal passage. Further histological investigation revealed *Aspergllus* to be infectious agent. Microbiological investigation excluded presence of fungi in body fluids as well as fungal contamination of the nasal cavity. Medical recommendations for the patient included administering of antifungal drugs, antibiotic follow-up, oral rinsing and brushing teeth.

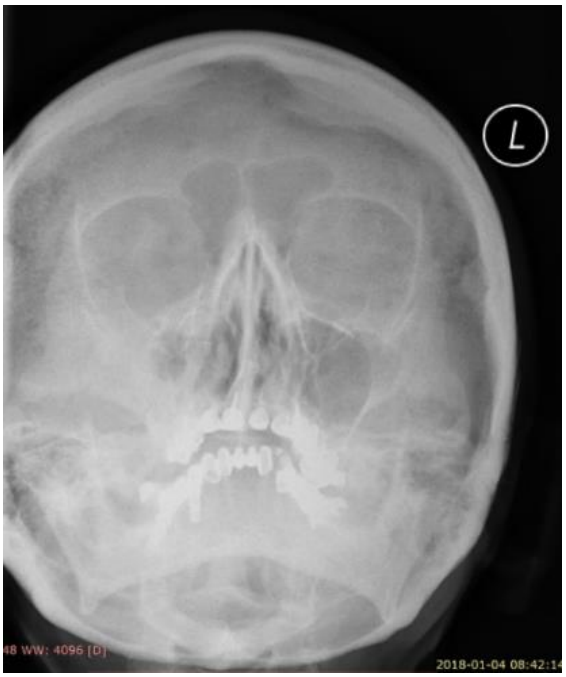


Figure 5.: CT scan after surgical treatment.

Discussion:

Underlying disease:

Multipe myeloma (MM) comprises about 10% of all primary hematologic malignancies, being second most frequent hematologic malignancy, and approxi-mately 1% of all neoplasms[4,5]. Typically MM develops from asymptomatic mo-noclonal gammopathy of undetermined significance (MGUS), which is diagnosed within 3% of men and women over 50 years old[6]. The risk of transformation MGUS into MM reaches 1% per year[6].

Some patients are diagnosed with Smoldering Multiple Myeloma, which a transient condition between MGUS and full-blown MM. Asymptomatic multiple myeloma variant occurs in about 8% of patients in whom clonal plasma cells population in the bone marrow is usually ranging from 10 to 20%, and mean serum concentrations of monoclonal protein is 3 g/dl[7]. In more than 90% of all cases, a reduction in gamma-class antibodies (the most common group of antibodies) is seen, whereas about 70% of patients are reported to have monoclonal light chains in the urine, which are fragments of antibodies excreted in urine[7]. The risk of conversion symptomatic variant of MM to the symptomatic reaches 10% per year during the first 5 years after diagnosis was made, however, after this period of time it decreases[7]. The average age of onset of MM is 60-65 years at the time of diagnosis[7]. MM below 40 years old is rather rare condition and stands for around 2% of all cases[7].Clinical manifestation of MM results from pathologic clonal neoplastic proliferation of the plasma cells, which produce mono-clonal immunoglobulin[8]. The most common ailment reported by the patients is bone pain (67%), whereas the most frequent complications arising from the disease are anaemia, bone disease and renal failure respectively[8]. Prompt diagnosis and implementation of the treatment is crucial for disease-free survival but does not change overall survival rate[8,9].The aim of the MM management is induction treatment pursued by consolidation with a HSCT. Thalidomid and dexamethasone comprise a standard therapy for MM, however, VTD (bortezomib, thalidomide, dexamethasone) induction therapy received before a HSCT improves near complete or complete response, which makes it a new standard management for patients eligible for transplants[10].The patient discussed in above case report received VTD com-bination, which was proved to accomplish significant median survival improvement within the patient with MM stage ISS II and III[11]. Furthermore, bortezomib is reported to have no influence on mobilization of the stem cell [12].

Fungal sinusitis:

Fungal sinusitis comprises several distinct medical conditions, which vary depending on presence of specific features. One of the feature, defined as fungal invasion distinguishes, weather fungal hy-phae penetrate the tissue, subsequently it is a basic division describing invasive and nonivasiverhinosinusitis[13]. Duration of fungal rhinosinusitis is another condition for proper classification and treatment of the disease. Present guidelines classify invasive sinusitis which lasts at least 3 months to be a chronic condition in contrast to acute one, lasting less than 3 months [14].

Noninvasive fungal rhinosinusitis com-prises fungal ball, localized fungal colonization, and allergic fungal rhino-sinusitis[15].Allergic fungal sinusitis is a separate medical condition yet

not fully investigated and conventionally stated to be the immune-modulated disease [16]. Because of the immunological origin of this medical entity, corticosteroids and surgery are currently considered to be the best treatment, diminishing antifungals role in therapeutic process. Sinusitis concerns 20% of general population, allergic fungal sinusitis accounts for approximately 5 to 10 percent of all chronic rhinosinusitis cases[17]. Fungus ball is a type of nonivasive fungal rhinosinusitiswhich should be suspected in case of patients complaining about unilateral nasal symptoms accompanied by headaches[18]. It is easily displayed by computed tomography and treated with endoscopic surgery[18].*Aspergillus* and *Murcoraceae* fungi respectively are the most frequent fungi that cause invasive fungal rhino-sinusitis within immunocompromised patients[19]. Yet, it is *Aspergillus spp*. Along with brown-black molds, different to *Mucorales*, that are the most frequent infectious agent for chronic fungal sinusitis [3]. Males are more likely to develop both – invasive and non-invasive aspergilloma, however, women are more susceptible to aspergillous fungal ball [14]. Due to the fact that computed tomography scan result is an insufficient evidence to diagnose fungal rhinosinusitis, further evaluation should be performed. During diagnostic process it is essential to demonstrate or exclude fungal hyphae invasion in local tissue, which is obtained by the histopathological re-sult[20]. Another crucial step is the assessment of the type of fungi and its susceptibility to common treatment during microbiological investigation[21,22].

Treatment of the invasive rhinosinusitis is challenging regarding to the fact that vast majority of patients concomitantly suffer from immunological disorders [23]. After surgical debriding of the affected sinus pharmacological treatment is advocated[3]. *Aspergillus* species are treated with voriconazole stated as a treatment of choice[3,24]. In case of in-tolerance lipid formulation of amphotericin B or isavuconazole is a preferred treat-ment[3].

Endomathasone impact on fungal sinusitis:

Endomethasone is a well-known and used for more than 50 years endodontic sealer which in its chemical composition includes zinc oxide[25]. Although freshly prepared it inhibits *Aspergillus* growth, after inactivation of desinfectants, zinc oxide is a microelement that promotes fungi such as *Aspergillus spp.* survive and then proliferate [25].

Early diagnosis and implementation of the treatment reduces the number of adverse outcomes and improves prognosis. Special attention should be paid to the patients with risk factors for fungal rhinosinusitis, such as diabetes mellitus, corticosteroid treatment, solid organ transplantation, hematologic malignancies.

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